



Office of Financial Management Information Technology Upgrade Policy Review

This issue paper reviews information technology (IT) upgrade policies and procedures, and recommends steps to reduce their overall cost to state government while maintaining adequate information technology that meets existing business needs. The impetus for this analysis is the following proviso included in the 2001-03 operating budget bill:

The office of financial management shall review policies and procedures regarding purchasing of information technology upgrades by state agencies. Information technology upgrades include replacement workstations, network equipment, operating systems and application software. The review shall document existing policies and procedures, and shall compare alternative upgrade policies that reduce the overall cost to state government for maintaining adequate information technology to meet the existing business needs of state agencies. Findings and recommendations from this review shall be reported to appropriate committees of the legislature by December 1, 2001. (2001 2nd ex sess c 7 s 129 [uncodified])

Executive Summary

Scope

The scope of this review is limited to desktop and notebook computers; agency network servers (Intel-based); desktop, notebook and server operating systems; and office automation software such as word processing, spreadsheets, electronic mail and calendaring applications.

Findings

- ❖ Information technology is a critical tool for conducting state business; and
- ❖ Agencies have been unable to achieve predictable, appropriate replacement cycles, due to budget constraints, disparate funding sources and the treatment of IT desktop and server replacements/upgrades as one-time expenses, rather than an on-going cost of doing business.

A number of factors drive the useful life of technology.

- ❖ The most forceful driver – upon which state government can exert the least control -- is the prevailing industry software cycle. Desktop software is produced or upgraded on an 18-month cycle. One software upgrade can usually be skipped without suffering productivity or support issues. But by the end of the third year, the software must be upgraded to keep up with vendor support, and compatibility within and among agencies and other partners. It is frequently impossible to continue using an older version, because incompatibility with other systems eventually forces an upgrade. Once one workgroup upgrades, everyone in the agency needs to upgrade to maintain compatibility, or else document compatibility and information- sharing issues become prominent, and support

costs increase with the complexity of multiple versions. The software then drives the hardware needs by requiring more memory, storage capacity, and faster processing speeds. Likewise, when a central service agency, such as the Office of Financial Management, upgrades or requires a specific version of a program for use with central systems, all agencies using that system must upgrade as well.

The second most significant driver is state government service delivery and support requirements, including:

- ❖ Information-sharing among agencies;
- ❖ Ease of use and access to Internet technologies;
- ❖ Use of central/shared systems;
- ❖ Security and privacy safeguards;
- ❖ Remote technology administration; and
- ❖ Statewide IT policy direction for “one face of government” through improved accessibility and usability of government information and services by its citizens.

Two main factors drive the total cost to acquire and operate technology:

Support costs (equipment and software installation, trouble-shooting, repair, and user assistance) are estimated to comprise 80 percent of the distributed computer environment costs, and are influenced by the following:

- ❖ Degree of standardization in the IT environment. The same type and level of hardware, operating systems, office automation software, and technology configurations, can minimize compatibility-related support costs;
- ❖ Degree of predictability in replacement life cycles. Predictability can minimize the level of effort devoted to integration and planning;
- ❖ Need for problem resolution and user support. Reliable technology and remote software management tend to reduce the need for user support;
- ❖ Age and reliability of technology. Reliable technology tends to maximize worker productivity (due to lower rates of down-time), and minimize calls for IT staff assistance in responding to problems. Many agencies have experienced more support costs and productivity loss when personal computers age beyond three years. PC's and network servers begin to fail, requiring more intervention of IT support staff, greater costs of parts and labor to repair, and the loss of productivity of program staff during down time or repeated re-booting; and
- ❖ Use of technology to accommodate remote technology management. Technology applications that must be installed and maintained at individual desktops increase the workload for IT staff. Applications that can be installed and maintained from a remote location, such as web-based applications, tend to reduce support costs.

Equipment and software acquisition are estimated to comprise 20 percent of the overall costs, and are influenced by:

- ❖ Frequency of acquisition. A shorter replacement cycle will increase both hardware and software costs, as well as related acquisition costs;

- ❖ Volume purchases. Agencies can leverage discounts when buying or leasing products in volume. Centralized purchasing within agencies, or at the statewide level can maximize knowledge of best ‘buys’ and risks to avoid; and
- ❖ Type of technology and degree of quality purchased. Notebook computers have a lower useful lifespan than desktop computers, due to greater wear and tear associated with being moved from place to place. Top-of-the-line technology has a longer useful life, but tends to be priced above the optimum value point.

Factors influencing the entire life-cycle cost of technology include:

- ❖ Lease/purchase decisions. Depending on the type of technology needed, and the financial terms involved, leasing can provide greater budgetary predictability and lower life-cycle cost. Leasing is an acquisition strategy that provides consistency for budget, technology, and business planning, and lends itself more easily to an “on-going cost of business” funding model. Leasing is typically not an option for replacement cycles of more than 3 years, because the PC residual value is minimal; and
- ❖ Extent and quality of asset management processes and practices. An agency’s knowledge of the quantity and quality of its technology assets, as well as user requirements, can maximize the useful life of technology, as well as minimize unnecessary purchases.

Recommendations

Desktop, Notebook, and Software Replacement

Implement a three-year personal computer replacement cycle using a lease option when indicated by a lease-purchase analysis. A replacement cycle that reduces life-cycle cost by optimizing support costs will be the most effective and cost-efficient strategy for state government.

A two-year cycle may be needed for notebook computers. Notebook computers that are frequently moved receive more wear and tear than desktop units, and may need replacement more often. Each agency or division should establish replacement criteria, depending on the use of notebooks; a three-year replacement cycle may work for notebooks in selected cases.

Server Replacement

Although it is critical for agencies to replace servers at optimal times, it is more difficult to recommend a specific life-cycle replacement time period. Server life cycles range from two years to six years, depending on their utilization. Agencies should determine server life-cycle criteria and replacement schedules based upon an agency’s business requirements.

Hardware and Software Life Cycle Analysis

The Department of Information Services should provide recommended models for agencies to prepare hardware and software life cycle analyses, and to better track the total operating cost of IT resources.

Issue: Information Technology (IT) upgrade policies and procedures

Status

This report was prepared by the Enterprise Management Group (EMG) IT Upgrade Review Work Group, and approved by the Enterprise Management Group.

Decision Objective

Recommendations to OFM and to appropriate legislative committees regarding IT upgrade policies and procedures that may reduce overall costs to state government for maintaining adequate information technology to meet the existing business needs of state agencies.

Decision Authority:

EMG to OFM; OFM to legislative committees.

Business Area Impacted:

All state agencies within Information Services Board authority, and their customers.

Background

Issue Description

Until the mid-1990's, desktop and network technology was fairly stable. Most business systems were built on large mainframes that required little if any interaction at the desktop. All processing of information was done on mainframes, with over-night batch jobs producing paper reports that were manually distributed. Networks between offices and other agencies were limited to being able to access only the mainframe systems; data being the only thing passed along the wire.

With the advent of office automation, as well as systems that processed data at the desktop, we were able to begin to build systems that shared data between agencies and with external clients. This evolution from a mainframe environment with dumb terminals to more sophisticated, interacting systems has dramatically increased the need for desktop computers, network servers, operating systems and application software.

The cost of technology hardware and software increased, but so did the overall benefit to state government and to the public. The efficiencies that agencies have realized through automation have allowed them to do more with less. Cuts in funding and staff have not, in most cases, resulted in reduction in services to the public. In fact, in the past few years, new services to the public have significantly increased much more rapidly than ever before. This rapid change has been driven by and made possible by the advances in desktop and networking computing hardware and software.

Historically, personal computers and basic office applications have been treated as one-time expenses, purchased, upgraded or replaced as agencies can get budget approval or utilize unspent dollars in other areas. Investments in desktop technologies are no longer a one-time expense, but

an on-going cost of doing business. Personal computers and basic office applications are everyday tools for state government employees. Increasing business requirements, frequent technology changes and technology support costs drive the need for recurring IT replacements.

Definitive IT replacement cycles have been difficult to establish consistently across state government due to the budget uncertainties in each biennium, and the reluctance to view these expenses as the on-going cost of doing business. Each time funding is requested for replacements, a substantial amount of time and energy is expended in documenting the requirements and the justification.

Scope of Analysis

The scope of this review is limited to desktop and notebook computers; agency network servers (Intel-based); desktop, notebook and server operating systems; and office automation software such as word processing, spreadsheets, electronic mail and calendaring applications.

This review does not include mainframes and related peripherals, and mid-range computing platforms or network infrastructure components such as routers, switches and bandwidth. Life cycles for these elements are different from desktop life cycles and are driven by specific events rather than “typical” time cycles. Examples may include increased usage by staff or clients, and use of technologies like web-enabled video requiring more “bandwidth.” The network infrastructure is critical, but replacement strategies for infrastructure should be addressed separately from this analysis.

Current Practices

There are approximately 102,000 state employees, almost all of who use personal computers to support or deliver services directly to the citizens of Washington State. In Department of Information Services’ “Managing the Digital State: The 2001 Washington State Information Technology Performance Report,” it is estimated that state government invests more than \$1.3 billion each biennium in computing, telecommunications and related services and operational support. Projected expenditures for the 2001-2003 fiscal period for personal computer and software-related purchases is \$80.6 million dollars and for hardware-related purchases is \$217.7 million dollars (according to this same report).

Agency IT managers typically target a certain percentage of their desktop and server “base” for replacement in any given biennium. When funding is not received and other resources cannot be used, agencies must utilize equipment that negatively affects productivity, customer service, and support costs. In addition, agencies may not be able to capitalize on advances in technology, some of which – such as security – may increase risk if not utilized.

Total-cost of operation (TCO) of desktop and server hardware and software requires dedicated staff time to tracking costs related to installation, maintenance, and replacement. IT staff support demands often necessitate that this task receive a low priority. A cost-benefit analysis of specific replacement cycles cannot be undertaken without this information.

Significance of Issue

As of this writing, the state faces an uncertain financial future and an immediate state budget shortfall currently estimated at \$1.2 billion for the 2001-03 Biennium. These budget pressures,

likely to extend into future biennia, are the result of revenue shortfalls from a weakening economy, as well as expenditure increases related to caseload and population increases, voter-approved spending mandates, and other factors. Tight state finances make development of a consistent IT replacement policy even more important than during times of greater resource availability, because it forces agencies to be much more judicious about where they spend their resources.

Information technology tools are essential to state government services and accountability. They have become as much a part of doing business as buildings and electricity. Disruption of these essential tools because of downtime, non-compatibility, or security issues has major affects on state government productivity and services to the public.

Citizens will continue to push state government to provide more services, and services that are more responsive to their needs; services that are available any time, anywhere. Use of the Internet will become more prevalent to provide such things as training for those looking for job opportunities, as well as for those who, due to disability or other limitation, may require alternative methods of service delivery.

As more services are provided through technology, it becomes more important to protect the state's assets from such things as security breaches, viruses, and unauthorized access to confidential information.

In order to meet these challenges and to continue to provide secure, efficient, and stable services, state government requires desktop and network computing devices, operating systems and application software that provide up-to-date and effective features. A regular replacement schedule can help ensure that desktop and network server technology consistently supports service delivery.

Lagging IT replacement cycles present the following **challenges** for state government:

- ❖ Inability to take advantage of evolving security features; leaving networks and applications susceptible to security and privacy breaches and major system failures due to viruses;
- ❖ Equipment failures that result in employee downtime frustration, that results in the inability to respond to customers. Even partial failures, such as frequent "reboots," can result in hundreds of hours of downtime. The inability to access systems or applications, particularly multi-agency systems (i.e., Department of Personnel's E-Learning system and Office of Financial Management's Internet-Based Budgeting System), hinders greater efficiencies or consistency;
- ❖ Incompatibility of office automation products that can cause problems with communications and/or information-sharing within or among agencies;
- ❖ Increased costs for replacement parts, and increased time required to fix equipment, especially when it may be totally replaced not long after the repair;
- ❖ Time to locate replacement parts or "cannibalize" them from other equipment; and
- ❖ Undefined replacement cycles that can result in inconsistent and less predictable budget requirements, equipment dollars being reallocated, and unexpected expenses when equipment fails and has to be replaced.

Development of, and adherence to, appropriate IT replacement cycles provides **benefits** including:

- ❖ More predictable on-going costs for budgeting purposes;
- ❖ Lower overall IT support costs through use of shared applications and information, and core administrative applications;
- ❖ Less energy and effort devoted to analyzing and justifying replacement requests in each individual agency;
- ❖ More consistent access to evolving technology security strategies;
- ❖ Easier implementation of statewide technology policy direction, such as consistency in customer access and the “look and feel” of applications;
- ❖ Greater consistency of operating systems and application versions, which reduces complexity of the environment, support costs, and administrative overhead associated with asset management;
- ❖ Remote administration of desktops (software installations and upgrades) that can avoid considerable time and travel costs compared to individual installations; and
- ❖ Ability to take advantage of warranty agreements and software licensing agreements to reduce the overall costs associated with maintaining obsolete software and hardware.

Context

IT Replacement Drivers

Replacement of computing hardware and software is most often driven by factors outside the control of individual agencies. Some drivers result from statewide policy direction; other drivers come from the technology industry. Examples include:

- ❖ Business functions and/or services growing in such a way that new equipment is essential to delivering core service;
- ❖ Technology cycles of 18 months and changes that render existing hardware and software obsolete (i.e., unsupported versions, unavailable parts, and incompatibility with other versions or with new versions of software);
- ❖ “Domino” effect of hardware and software advances; a change in one requires a change in the other;
- ❖ Increased security risks and requirements due to technology advancements, public access policies, and terrorism threats;
- ❖ Participation in statewide initiatives to improve services to the public; and
- ❖ Essential cross-agency functions where software compatibility within and among agencies is mandatory, such as e-mail communications, enterprise application systems, and document sharing.

Current Practices

Most agencies strive to achieve a three- to four-year replacement cycle for desktop computers, two- to three -year for laptops, four- to five-year cycle for network servers and two- to three-year cycle for software upgrades. Having a predictable replacement cycle evens out expenditures and workload. Although some agencies have been able to extend the life of their desktop computers beyond a three-year life cycle, most agree that beyond three years the cost to maintain the equipment and risk of equipment failure increases. Some agencies have been successful in achieving the three or four -year replacement cycle either through decision packages or by redirecting dollars that became available throughout the biennium.

Agencies that have not been successful in achieving a replacement cycle for IT equipment now struggle to manage multiple operating systems and desktop software configurations, as well as to maintain obsolete equipment that no longer has any residual value. The cost to maintain this equipment in resources, staff downtime, and replacement parts is typically more than the cost of a new machine.

Industry Research

Other Organizations' Lifecycles

An industry survey revealed that most organizations recognize the business benefits of a reasonable replacement cycle for laptops and PCs, including avoidance of downtime and additional support costs for equipment at the end of, or past, its prime. A consistent, appropriate replacement cycle helps smooth out costs and effort, allowing for better management of this important resource and the business it supports. It also allows organizations to take advantage of advances in security features and remote desktop administration.

The Washington State Military Department conducted a telephone survey of other government and private sector organizations during Summer 2000 to assist in the development of an internal departmental IT replacement policy. Of the fourteen public and private organizations surveyed, eleven used a replacement cycle of three years or less. (See **Appendix A**, Telephone Survey Conducted by the Washington State Military Department).

Although most organizations seem to favor a three-year replacement cycle for laptops and PCs, an August 2001 Gartner Group research note predicts, "that, by 2004, 75 percent of all enterprises will adopt a four-year PC desktop replacement strategy for up to 85 percent of their users". The reason for this prediction is that the rate of improvement in hardware has outpaced the rate of software; thereby, making the productivity gains from more recent software upgrades less compelling than those of the past. It also assumes at the outset of 2004 that an enterprise will possess hardware and software capacity (i.e., processor speed, memory, hard drive capacity, software operating system and software applications version, etc.) that is comparable to the industry average. If an enterprise is behind the average, a four-year replacement cycle will initially not be possible.

State of Texas' Life Cycle Model

The State of Texas provides guidelines to state agencies for establishing life cycles for personal computers (PC Life Cycles: Guidelines for Establishing Life Cycles for Personal Computers,

Department of Information Resources, State of Texas, January 2000). A basic premise of the article is that agency specific data that support the life cycle timeframe must be developed rather than the reliance on an industry standard of 2-3 years.

Several steps are prescribed to develop an appropriate life cycle. First, review executive management's needs and priorities for the organization and technology support. This involves developing an understanding of processes and identifying where problems exist. Second, evaluate agency IT needs through conducting a needs assessment of end use computing needs, both current and future. Third, evaluate technical factors through reviewing information on existing technology product offerings to determine which technology is most appropriate for end users and cost effective for the agency. This involves matching user needs to the available technology, and considering factors such as agency priorities and technology developments.

Prescribed steps to determine how long a PC is useful and cost effective to an organization:

Establish a framework to evaluate the results of the IT effort/initiatives and consider the overall importance of technology to delivering the service to citizens. To assess the dollar value of these benefits, agencies will need to track how much they are spending for PC acquisition, as well as how much they are spending to support these assets. Some examples of life cycle benefit examples include the following:

- ❖ Improved management of hardware assets through better knowledge of and control over the PC inventory;
- ❖ Cost savings from standardizing equipment and controlling when, what, and how PC's are purchased; and
- ❖ Reductions in technical support costs for PC troubleshooting and maintenance.

Evaluate agency IT needs by developing an understanding of agency end user needs and support staff resources.

The development of an effective life cycle requires knowing how to gauge whether or not technology is meeting existing agency needs within current budgetary constraints. The most effective replacement or upgrade decisions are driven by whether or not existing equipment meets existing productivity standards. Some specific areas for assessment include the following:

- ❖ Develop a current PC inventory to determine the number of PCs on hand and the type of technology features they contain;
- ❖ Determine Information Resources staff capacity to provide support and application development; and
- ❖ Develop a detailed understanding of end user computing needs. This involves identifying functional user groups and the types of PCs they use. This information is used to build an estimated timeline for when users will need to upgrade or replace existing equipment.

Evaluate technology factors in order to understand the rate of technology change.

Included in this step in an evaluation of new and existing technology. This information is important for determining how to incorporate upgrades into a life cycle.

Total Cost of Operation (TCO) Efficiencies through Architectural Complexity Reductions

A Gartner Group article (March 2, 2001 Research Note, entitled “Where Cost Reductions Lie: TCO Lessons Learned), recommends that support costs can be reduced through reducing architectural complexity. Architectural complexity is defined as the “variations in configurations, service levels, user dispersion and other changes to the environment that add to the enterprise’s technical or operational diversity.” IT asset managers can drive support costs down by focusing their efforts on five factors that can reduce support costs:

- ❖ Diversity of desktop operating systems and offices suites. Enterprises that have more than three to five separate operating system versions, experience increased (20 to 50% higher than necessary) support costs in terms of labor and connectivity;
- ❖ Maintain a variety of different service levels. Greater variations in the service level agreements make management more difficult, and ultimately increase support costs;
- ❖ The number of personnel physical moves. Server reconfigurations, and pulling cable increase costs;
- ❖ User dispersion: a number of different physical locations are expensive to support; and
- ❖ Frequency of major software rollouts. Excessive changes of the operating system and application environment can substantially increase support costs.

Seat Management

The Federal General Services Administration (GSA) sponsors a program called “Seat Management”. Seat management is defined as “managed life cycle support for the entire distributed computing environment (hardware, software and support services) from a single point of contact and for a fixed price.”

The vendor of choice sets up the computer, installs software, installs the computer on-site, maintains the computer, and then replaces the computer at the end of its life with a new one. Like leasing, the vendor is the owner of the asset and the customer pays a fee “per seat.” Unlike leasing, the vendor provides services that go beyond most leasing programs. Basic services include: hardware/software acquisition, planning, configuration, testing, installation, support, maintenance, repair, upgrades, training, asset management, technology replacement, disposal, software license management, central help desk support and management of existing assets. Seat Management can be customized as “cradle-to-grave” services, or only part of the total package of services. PC leasing can be configured similarly to the seat management model.

Proponents of seat management claim that hardware and software purchases, the typical focus of technology funding efforts, accounts for only 20 percent of the distributed computing environment costs. This narrow definition of costs neglects support services that account for 80% of actual distributed computing costs. The managed lifecycle approach concentrates on the 80% and, when instituted, results in a lower life cycle cost.

Life cycle cost can be misleading as an indicator of cost-effectiveness. Unless an organization has fully funded its IT program, *and* tracked all associated support costs, life cycle cost will seem to go up at first when a seat management approach is used.

Several federal agencies and states have implemented seat management, most notably the General Services Administration; the National Aeronautical and Space Administration; Bureau of Alcohol, Tobacco and Fire Arms; the University of Virginia; the City of Philadelphia; the Commonwealth of Virginia; and the State of Texas.

Lease/Purchase Options:

Individual agencies can take advantage of acquisition vehicles that promote aggregated or group purchasing practices to maximize the discount levels available from manufacturers or vendors. This may include master contractors' aggregation of products by Department of Information Services. Master contracts are competitively acquired optional-use agreements with special discount pricing.

The Department of Information Services (DIS), through its enabling legislation, is authorized to establish and administer master contracts and to aggregate IT products. Departmental Technology Brokering Services assists state and local governments with selection and acquisition of competitively acquired hardware and software products for both the desktop and network environment. Both master contracts and product aggregation not only increase discount levels for the state as a whole, they also decrease labor costs of the acquisition process and limits exposure to financial risks by the participating agencies. This purchasing service has been identified as an administrative "Best Practice" that can be used by agencies to reduce costs.

Leasing

Conditions for an "Operational Lease"

- ❖ The present value of lease payments must be less than 90 percent of "fair market value;"
- ❖ The lease term must be less than 75 percent of the useful life (4-year leases would likely break this rule);
- ❖ The lease cannot contain a bargain purchase option; and
- ❖ The lease cannot provide for transfer of ownership.

Leasing advantages

- ❖ Establishes a commitment to information technology replacement cycles and reduces temporary reallocation of resources away from critical service delivery tools;
- ❖ Allows agencies to accurately establish monthly or annual per/desktop costs for each employee within the agency;
- ❖ Easier to establish a consistent technology platform across work divisions, which can leverage support resources and reliability of service delivery;
- ❖ Moves IT purchase financial considerations from capital acquisitions to continuing allocation models;
- ❖ Spreads costs over a longer timeframe that may span multiple budget periods. This also defers (up to one year) the actual cost of the acquisition;

ENTERPRISE MANAGEMENT GROUP
INFORMATION TECHNOLOGY UPGRADE POLICY REVIEW

- ❖ Technology replacement cycles are guaranteed, which can improve planning for support and budget requirements, and business and administrative applications; and
- ❖ The agency does not own the equipment. With the appropriate “funding out” clauses, they may have the equipment removed if the agency loses its ability to pay.

Leasing disadvantages

- ❖ Initial justification and analysis is considerably more detailed and time consuming; and
- ❖ Purchases over time increase overall direct expense (cost of money, billing and payment cycles increased). Deferring the payment most likely offsets this.

Purchasing

Should be used in two situations:

- ❖ Full up-front purchases should be carried out where budgets indicate funds are immediately available. There should also be a clear plan to transition out equipment that is past its lifecycle and to plan funding for future replacement; and
- ❖ Lease negotiation and payments for a single or small numbers of computer purchases may not be cost effective.

Evaluation of IT Replacement Cycles

Criteria Used to Evaluate Alternatives

Business requirements of the state and the organization (or group), such as:

- ❖ Sustained, consistent service delivery;
- ❖ Enhanced service delivery (i.e., 24 hour, expanded access, new features);
- ❖ Leveraging technologies (shared applications or utilization of statewide core systems) for cost savings and efficiencies;
- ❖ Impacts to and from other organizations’ IT decisions;
- ❖ Ability to share documents, information and/or communications within and among agencies;
- ❖ Maximizing benefits of replacement while minimizing costs;
- ❖ Confidentiality of private data; and
- ❖ Security of systems that can be accessed by the general public or specific public customers.

Frequency of hardware and software technology changes, and resulting obsolescence, such as:

- ❖ Functionality improvements that will support business requirements;
- ❖ Life cycles of hardware and software (considering available parts and support);

- ❖ The “domino” effect – hardware changes drive software changes, software changes drive hardware changes; and
- ❖ The marginal value of each upgrade versus the costs. The benefit of an upgrade must exceed the cost of support staff and end-user training associated with the upgrade.

Life cycle costs, such as:

- ❖ Acquisition and installation cost of new equipment and software;
- ❖ Training costs for new equipment and software;
- ❖ Moving old equipment and re-installing for “trickle-down” replacements; and
- ❖ Fixing and/or upgrading equipment at or beyond the end of its expected life.

Appendix B provides a replacement cycle comparison for desktop hardware and software. The three most viable options are evaluated.

Appendix C compares the three alternatives using evaluation criteria, such as cost, compatibility, productivity, and maintenance.

Recommendations

Desktop, Notebook and Software Replacement

Implement a three-year personal computer replacement cycle using a lease option when indicated by a lease-purchase analysis. A replacement cycle that reduces life-cycle cost by optimizing support costs will be the most effective and cost-efficient strategy for state government.

A two-year cycle may be needed for notebook computers. Notebook computers that are frequently moved receive more wear and tear than desktop units, and may need replacement more often. Each agency or division should establish replacement criteria, depending on the use of notebooks; a three-year replacement cycle may work for notebooks in selected cases.

Server Replacement

Although it is critical for agencies to replace servers at optimal times, it is more difficult to recommend a specific life-cycle replacement time period. Server lifecycles could range from two years to six years, depending on their utilization. Agencies should determine server life-cycle criteria and replacement schedules based upon and agency’s business requirements.

Hardware and Software Life Cycle Analysis

The Department of Information Services should provide recommended models for agencies to prepare hardware and software life cycle analyses, and to better track the total operating cost of IT resources.

Appendix A**Survey of Fourteen Public and Private Organizations' Replacement Cycles**

Organization	Life Cycle	Contact	E-mail Address
Honda of America	All: 3 year	Roger Cronin	Roger_Cronin@ham.honda.com
Employer's Unity	All: 4 year	Bob Brown	B.Brown@empunity.com
Motorola Personal Communications	Laptops: 24 month Desktops: 30 month	John G. Vlasak	John.Vlasak@motorola.com
Broadwing Communications	Laptops: 24 month Desktops: 24 month	Tommy Woolverton	Tommy.Woolverton@broadwing.com
Cayman Islands Department of Tourism	Workstation: 3year Servers: 5 year Printers: 5 year	Jeff Goddard	Jgoddard@candw.ky
Washington County Government, MD	All: 3 year	Doug Oliver	Doliver@wc-link.org
Mount Kisco Medical Group	All: 3 year	Justin Salandra	Jsalandra@MKMG.com
Space Warfare Center/Analysis & Engineering	All: 18 months	Plenty Groover Jr.	pgroover@pcisys.net
Applied Business Computer Services	All: 2 year	Jim Keneaster	abc_services@juno.com
AutoLycus Inc.	All: 1 year	Jonathan Schneider	autolycus@operamail.com
Cynaptec Information Systems	All: 3 year	Matthew Barrett	mbarrett@cynaptec.net
Earth Tech Inc	All: 3 year	Jerry Wallenborn	Jerry Wallenborn
University of Nebraska at Omaha	All: 3 year	Leah D. Cross	Leah D. Cross
Union Hospital Health Group, Inc.	All: 3-5 years	John McGlynn	John McGlynn

Appendix B

Replacement cycle comparison for desktop hardware and software

The following table summarizes the three alternatives considered for IT upgrade replacement practices. **Alternative #1 is recommended.**

Alternative #1	Alternative #2	Alternative #3
<ul style="list-style-type: none"> ❖ Two-year notebook and three-year PC/office automation software replacement cycle. It is preferable to consider using volume discount lease options established by DIS for all agencies. ❖ A two to three-year replacement cycle is the most optimal considering the technology, business and cost drivers. This approach allows acquisition at an optimal cost point, helps curb support costs, assures compatibility, and takes advantage of leasing options. ❖ A leasing acquisition strategy provides benefits, such as more predictable costs, greater consistency of tools, greater efficiencies in software installation (since computers usually come with installed software), and distribution of costs over a longer timeframe. It can also provide a mechanism for extended use for K-12 classrooms, further leveraging overall state resources. 	<ul style="list-style-type: none"> ❖ Two-year notebook and PC/office automation software replacement cycle. It is preferable to consider using volume discount lease options established by DIS for all agencies. ❖ A two-year replacement cycle provides advantages of fewer equipment failures and greater chance of compatibility among desktops. It also accommodates the most recent software and hardware functionality, and could utilize a lease acquisition strategy. ❖ A two-year cycle is not recommended unless specifically required based on business needs. It is less cost effective than a three-year cycle because there is additional work in installation and training for new applications more often. ❖ It can also provide a mechanism for extended use for K-12 classrooms, further leveraging overall state resources. 	<ul style="list-style-type: none"> ❖ Four-year PC/office automation software replacement cycle, through purchase option. ❖ A four-year cycle provides the lowest purchasing costs over the life span of the equipment. However, other costs, such as additional support related to failures, repairs, and software incompatibility likely exceed cost savings from extending the purchase period. ❖ Opportunity costs may include the inability to take advantage of advances in software capability for security, privacy, remote administration, and statewide technology and access strategies. ❖ A lease option is generally not available or cost-effective past a three-year cycle. ❖ Longer replacement cycles produce risks related to security, service interruptions, additional costs for support and parts, downtime and inability to effectively share information and/or systems.

Appendix C

Detailed replacement cycle comparison for desktop hardware and software:

Cycle	Category	Advantages	Disadvantages
2 year	Cost	<ul style="list-style-type: none"> ❖ Can use a lease acquisition strategy. ❖ Purchase/lease cycle is aligned with biennium budget cycle. ❖ Lowers the overall cost for technical support and maintenance. 	<ul style="list-style-type: none"> ❖ Costly to replace equipment this frequently due to staffing requirements and equipment replacement costs ❖ Greater staff cost associated with negotiating purchase/lease agreement, more frequent training and setup.
	Compatibility	<ul style="list-style-type: none"> ❖ Desktop operating system and software are the same, or at least compatible, versions. ❖ Developers worry less about building for the “least common denominator” because even the low-end PCs are relatively new. 	<ul style="list-style-type: none"> ❖ Increases development cycle as hardware and software upgrades may force programming changes to custom business applications that run on the desktop.
	Productivity	<ul style="list-style-type: none"> ❖ Equipment is current enough to accommodate the needs of new, robust business applications. ❖ Newer equipment has more computer capacity (faster processing speeds, more storage, etc.) ❖ Users will be able to take advantage of the newest software features available. ❖ Less potential for downtime created by equipment failure. 	<ul style="list-style-type: none"> ❖ End users need to re-learn new versions of operating systems and software more frequently. ❖ New versions of software may be “buggy” and not yet proven in a production environment.
	Maintenance	<ul style="list-style-type: none"> ❖ Fewer equipment repairs. ❖ Less need for “trickle-down” relocation of PCs. 	<ul style="list-style-type: none"> ❖ Frequent replacement may be disruptive if technicians are required to configure desktops for unique individual needs.

Cycle	Category	Advantages	Disadvantages
3 year	Cost	<ul style="list-style-type: none"> ❖ Can use lease acquisition strategy. ❖ Provides a lower overall combined cost (purchase price and support costs) over the lifespan of the equipment. ❖ Matches the current accepted "industry standard" lifespan for desktop equipment. 	<ul style="list-style-type: none"> ❖ Equipment may continue to provide adequate functionality after the recommended lifespan for some uses.
	Compatibility	<ul style="list-style-type: none"> ❖ Equipment and software are new enough to be compatible with almost all business applications. ❖ Desktop environment should meet the needs of most end users. 	<ul style="list-style-type: none"> ❖ May not be compatible with the newer, more robust business applications. This would most likely occur in year 3 of the life cycle.
	Productivity	<ul style="list-style-type: none"> ❖ Provides reasonable computing power for most users. ❖ Users do not have to re-learn new operating systems or application software as frequently. ❖ Less potential for downtime created by equipment failure. 	<ul style="list-style-type: none"> ❖ May not provide adequate computing resources for power users.
	Maintenance	<ul style="list-style-type: none"> ❖ Equipment reaches the end of its life cycle before repairs are likely to occur. 	

Cycle	Category	Advantages	Disadvantages
4 year	Cost	<ul style="list-style-type: none"> ❖ Purchasing costs are lower over the life span of the equipment. 	<ul style="list-style-type: none"> ❖ Support costs may be higher over the life span of the equipment. ❖ Need to buy at “bleeding edge” of capacity (most advanced technology) to make it last 4 years, which is not the best price point. ❖ Probably cannot use lease acquisition strategy. ❖ May need to buy software before available hardware can support it to continue software maintenance agreements ❖ If a “trickle-down” strategy is used, costs to move and upgrade equipment can exceed the value of the extended life.
	Compatibility	<ul style="list-style-type: none"> ❖ Business applications developed for a particular desktop environment will not need to be updated as frequently. 	<ul style="list-style-type: none"> ❖ Older equipment may not be able to perform well with newer business applications. ❖ Desktop operating systems and software on older equipment may be incompatible with newly refreshed equipment within or between state agencies.
	Productivity	<ul style="list-style-type: none"> ❖ May meet the needs of most low-end users. ❖ Users won't need to re-learn new operating systems or application software as often. 	<ul style="list-style-type: none"> ❖ Users may experience downtime and decreases in productivity. ❖ Service delivery may be interrupted due to downtime. ❖ Need for greater processing speed may occur before the end of the life cycle. ❖ Equipment and software may become obsolete.

ENTERPRISE MANAGEMENT GROUP
INFORMATION TECHNOLOGY UPGRADE POLICY REVIEW

Cycle	Category	Advantages	Disadvantages
4 year	Maintenance	<ul style="list-style-type: none"> ❖ Technicians can become knowledgeable with the configuration requirements of particular makes/models. 	<ul style="list-style-type: none"> ❖ Additional expenses for warranty upgrades may be necessary, as equipment may not be covered by warranty for the duration of the lifespan. ❖ Repair costs may increase. ❖ Replacement parts may be difficult or impossible to find. ❖ More complex environment results with additional operating systems and software versions, requiring more support time. ❖ May not be worth the cost to repair older equipment. ❖ "Trickle down" relocation of equipment may occur more frequently, and is costly and disruptive for minimum additional life.